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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,998	05/04/2005	Jin Jang	WELLT-014PUS	2592
22494 7590 05/30/2008 DALY, CROWLEY, MOFFORD & DURKEE, LLP SUITE 301A 354A TURNPIKE STREET CANTON, MA 02021-2714				
EXAMINER TRAN, MINH LOAN				
ART UNIT 2826		PAPER NUMBER		
NOTIFICATION DATE 05/30/2008		DELIVERY MODE ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@dc-m.com
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Office Action Summary

Application No.

10/533,998

Applicant(s)

JANG ET AL.

Examiner

Minh-Loan T. Tran

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Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 and 22-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 and 22-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
- Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of amended claims 1 and 7 are withdrawn in view of the newly discovered reference(s) to Uochi et al. (2001/0053613) and Ohtani et al. (6,184,068). Rejections based on the newly cited references follow. This action is not made final.

Specification

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-20, 22-33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification does not disclose "depositing a metal having a surface density in a range of 10^{12} cm^{-2} to 10^{15} cm^{-2} " as recited in the amended claims 1 and 7.

3. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 9, line 2, "the dielectric material" lacks of antecedent basis. It is unclear as to whether it is being referred to the dielectric substrate recited in claim 1.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 8-11, 17, 19, 22-29, 32, 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Uochi et al. (2001/0053613).

With regard to claims 1 and 10, figures 1A-1E of Uochi et al. disclose a phase transition method of an amorphous material comprising steps of depositing the amorphous silicon 12 on a dielectric substrate 10; forming a cap layer 13 on the amorphous silicon 12; depositing a metal Ni having a surface density in a range of 10^{12} cm^{-2} to 10^{15} cm^{-2} on the whole surface of the cap layer 13 ; and performing a phase transition (i.e. crystallization the amorphous material) on the amorphous silicon 12.

With regard to claim 2, figures 1A-1E of Uochi et al. further disclose a step of depositing a buffer layer 11 before the step of depositing the amorphous silicon 12 on the dielectric substrate 10.

With regard to claim 3, figures 1A-1E of Uochi et al. disclose a step of performing preliminary thermal treatment (i.e. annealing at 550°C) before the

step of performing a phase transition on the amorphous silicon 12. Note lines 1-3 of paragraph [0026] of Uochi et al.

With regard to claim 8, paragraph [0030] of Uochi et al. discloses a step of performing a secondary phase transition on the phase-transitional material 12a after the step of performing the phase transition on the amorphous material 12.

With regard to claim 9, figures 1A-1E of Uochi et al. disclose the dielectric substrate is a glass substrate.

With regard to claim 11, figures 1A-1E of Uochi et al. disclose the cap layer 13 is a single film comprising silicon oxide film.

With regard to claim 17, figures 1A-1E and lines 8-10 in paragraph [0025] of Uochi et al. disclose the cap layer 13 having a thickness of 200 Å.

With regard to claim 19, figures 1A-1E of Uochi et al. disclose the deposition of the metal (i.e. Ni) is performed by using ion implantation. See paragraph [0025] of Uochi et al.

With regard to claims 22 and 23, figures 1A-1E and paragraph [0025] of Uochi et al. disclose the metal is a nickel and the metal is deposited to have a thickness of 5 Å to 100 Å.

With regard to claim 24, figures 1A-1E and paragraph [0025] of Uochi et al. disclose the buffer layer 11 is a silicon oxide film.

With regard to claim 25, figures 1A-1E and paragraph [0026] of Uochi et al. disclose the preliminary thermal treatment is performed at a temperature of 550 ° C.

With regard to claims 26 and 28, figures 1A-1E and paragraph [0026] of Uochi et al. disclose the phase transition of the amorphous silicon 12 is performed by thermal treatment method at 550 ° C..

With regard to claims 27 and 29, paragraph [0030] of Uochi et al. discloses a step of performing a secondary phase transition is performed by using a thermal treatment method at a 500 ° C.

With regard to claims 32 and 33, figure 1A-1E and paragraphs [0026] and [0030] of Uochi et al. disclose the electromagnetic field is applied in the thermal treatment process because the amorphous silicon layer 12 was crystallized by laser annealing.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 5, 6, 15, 16, 18, 30, 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uochi et al. (2001/0053613).

With regard to claim 4, figures 1A-1E of Uochi et al. do not clearly disclose a step of removing the metal Ni and the cap layer 13 after the step of performing a phase transition on the amorphous material 12. However, it would have been obvious to one of ordinary skill in the art to recognize that the metal Ni and the cap layer have to be

removed in order to form the active region for the thin film transistor. See figure 1B of Uochi et al.

With regard to claim 5, figures 1A-1E of Uochi et al. do not disclose a step of patterning the thermally-treated film after the step of performing preliminary thermal treatment before the step of performing a phase transition. However, it would have been obvious to one of ordinary skill in the art to form a step of patterning the thermally-treated film after the step of performing preliminary thermal treatment before the step of performing a phase transition in order to form the active region for the thin film transistor. Note that a mere **reversal** of the essential method steps involves only routine skill in the art. In re Einstein, 8 USPQ 167.

With regard to claims 6 and 18, figures 1A-1E of Uochi et al. do not disclose a step of depositing a second cap layer on the metal. However, it would have been obvious to one of ordinary skill in the art to deposit a second cap layer on the metal in order to move the metal ions from the crystalline semiconductor. Further, figures 1A-1E of Uochi et al. do not disclose the thickness of the second cap layer is in the range of 0.1 to 1000nm. Although Uochi et al does not teach the thickness of the second cap layer as that claimed by Applicant, the thickness differences are considered obvious design choices and are not patentable unless unobvious or unexpected results are obtained from these changes. It appears that these changes produce no functional differences and therefore would have been obvious. Note *In re Leshin*, 125 USPQ 416, *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Circ. 1990).

With regard to claims 15 and 16, figures 1A-1E of Uochi et al. do not disclose the cap layer 13 is deposited by a PECVD method. However, it would have been obvious to one of ordinary skill in the art to form the cap layer of Uochi et al. using a PECVD method because such method is conventional in the art for forming the insulating layer on the semiconductor material.

With regard to claims 30 and 31, figures 1A-1E of Uochi et al. do not disclose the thermal treatment is performed by one selected from a halogen lamp, an ultraviolet lamp and a furnace. Although Uochi et al does not teach the kind of lamp that is used for thermal treatment as that claimed by Applicant, the kind of lamp differences are considered obvious design choices and are not patentable unless unobvious or unexpected results are obtained from these changes. It appears that these changes produce no functional differences and therefore would have been obvious. Note *In re* Leshin, 125 USPQ 416, *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Circ. 1990).

Claims 7, 12-14, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uochi et al. (2001/0053613) in view of Ohtani et al. (6,184,068).

With regard to claim 7, figures 1A-1E of Uochi et al. do not disclose a step of depositing a metal Ni having a surface density in a range of 10^{12} cm^{-2} to 10^{15} cm^{-2} on the whole surface of the of a dielectric substrate. However, lines 42-48 in column 10 of Ohtani et al. disclose another method which comprises introducing the catalyst element (i.e. metal) under the amorphous silicon film 12. It would have been obvious to one of

ordinary skill in the art to form the metal Ni having a surface density in a range of 10^{12} cm^{-2} to 10^{15} cm^{-2} on the whole surface of the of a dielectric substrate such as taught by Ohtani et al. in order to promote a crystallization of a semiconductor region.

With regard to claim 12, figures 1A-1E of Uochi et al. do not disclose the cap layer comprises a first part having a thin thickness and a second part having a thick thickness. However, figures 2A-2C of Ohtani et al. disclose the cap layer comprises a first part 20 having a thin thickness and a second part 21 having a thick thickness. It would have been obvious to one of ordinary skill in the art to form the cap layer of Uochi et al. having a first part having a thin thickness and a second part having a thick thickness such as taught by Ohtani et al. for improving wettability. Note lines 25-38 in column 11 of Ohtani et al.

With regard to claim 13, figures 2A-2C of Ohtani et al. disclose a lower portion of the second part 21 is made of the same material (i.e. silicon oxide) as that of the first part 20. Note lines 25-38 in column 11 of Ohtani et al.

With regard to claim 14, figures 2A-2C of Ohtani et al. disclose an upper portion of the second part 21 is made of the same material (i.e. silicon oxide) as that of the first part 20. Note lines 25-38 in column 11 of Ohtani et al.

With regard to claim 20, figures 1A-1E of Uochi et al. do not disclose the metal is partially patterned by using one selected from photolithography, a photoresist and a shadow mask. However, figure 2A and 2B of Ohtani et al. disclose the metal is partially patterned by using a photoresist 21. It would have been obvious to one of ordinary skill

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in the art to partially pattern the metal of Uochi et al. using a photoresist such as taught by Ohtani et al. in order to form a desired pattern for the metal layer.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh-Loan T. Tran whose telephone number is (571) 272-1922. The examiner can normally be reached on Monday-Friday 9:00 AM-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue A. Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Mlt
05/08

/Minh-Loan T. Tran/
Primary Examiner
Art Unit 2826

